

Section 2. Coal

Coal prices are developed for the following three categories: coking coal; steam coal (all noncoking coal); and coal coke, imports and exports.

Coking coal, used in the industrial sector only, is a high-quality bituminous coal that is used to make coal coke. Steam coal, which may be used by all sectors, includes anthracite, bituminous coal, subbituminous coal, and lignite. In the industrial sector, coal consumption is the sum of coking coal and steam coal. The industrial coal price is the quantity-weighted average price of these two components.

Imports and exports of coal coke are available only on the national level and are accounted for in the industrial sector. Coal coke imports and exports are reported separately and are not averaged with other coal prices and expenditures.

Coking Coal

Coking coal is generally more expensive than steam coal; therefore, it is identified separately in the development of the price estimates. Coking coal prices are those paid at coke plants for coal received and include insurance, freight, and taxes.

Physical Unit Prices: All Years

Source publications contain physical unit prices for States, groups of States, or Census Divisions. Individual State prices are used directly for their respective States. Group and Census Division prices are assigned

to each State within the group. Wherever individual State prices or State group prices are unavailable, prices are assigned from adjacent or nearby States or Census Divisions or from States with similar coal use patterns as shown in Table A1.

Btu Prices: All Years

Btu prices for States are calculated from the physical unit prices and the constant conversion factor for coking coal. U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from the Combined State Energy Data System (CSEDS).

Data Sources

Prices

1981 forward: Energy Information Administration, *Quarterly Coal Report*, October-December issue, Table A3 (1981–1991), Table 39 (1992–1994), and Table 31 (1995 forward).

1977–1980: Energy Information Administration, *Coke and Coal Chemicals*, Table 19 (1977), Table 15 (1978), and Table 7 (1979, 1980).

1970–1976: Bureau of Mines, U.S. Department of the Interior, *Minerals Yearbook*, “Coke and Coal Chemicals” chapter, Table 22.

Consumption

1970 forward: Energy Information Administration, Combined State Energy Data System, coking coal consumption.

Table A1. Coking Coal State Group Price and Adjacent State Price Assignments

| State | Years | State or Division Prices Assigned |
|-------|------------------------|-----------------------------------|
| AL | 1997 | East South Central |
| CA | 1970–1982 | CA, CO, UT |
| CO | 1970–1982 | CA, CO, UT |
| IL | 1986–1996 | IN |
| | 1997 | East North Central |
| IN | 1997 | East North Central |
| KY | 1970–1987 | KY, MO, TN, TX |
| | 1988–1996 | OH |
| | 1997 | East South Central |
| MD | 1970, 1971 | MD, NJ, NY |
| | 1983–1991, 1993 | PA |
| MI | 1979 | MI, MN, WI |
| | 1980–1985, 1987 | MI, WI |
| | 1988–1991, 1993–1996 | OH |
| | 1997 | East North Central |
| MN | 1970–1978 | MN, WI |
| | 1979 | MI, MN, WI |
| MO | 1970–1987 | KY, MO, TN, TX |
| | 1988 | AL |
| NJ | 1970, 1971 | MD, NJ, NY |
| NY | 1970, 1971 | MD, NJ, NY |
| | 1972–1982 | MD, NY |
| | 1983–1996 | PA |
| | 1997 | Middle Atlantic |
| OH | 1997 | East North Central |
| PA | 1997 | Middle Atlantic |
| TN | 1970–1987 | KY, MO, TN, TX |
| | 1988–1991 | AL |
| TX | 1970–1987 | KY, MO, TN, TX |
| UT | 1970–1982 | CA, CO, UT |
| | 1983–1986 | TX |
| | 1988–1996 | IN |
| | 1997 | East North Central |
| VA | 1970, 1971, 1976, 1977 | WV |
| | 1978–1982 | VA, WV |
| | 1983–1986 | KY |
| | 1987–1996 | OH |
| | 1997 | East North Central |
| WI | 1970–1978 | MN, WI |
| | 1979 | MI, MN, WI |
| | 1980–1985, 1987 | MI, WI |
| WV | 1978–1982 | VA, WV |
| | 1983–1986 | KY |
| | 1987–1996 | OH |
| | 1997 | East North Central |

Conversion Factor: All Years

26.80 million Btu per short ton.

Steam Coal

Steam coal is used in all sectors. Price data are generally available in the electric utility, residential, and industrial sectors. However, no price data are directly available in the transportation and commercial sectors, and industrial sector steam coal prices are assigned to these two sectors. Data sources and calculations for estimating coal prices are discussed by sector. Estimates of the amount of steam coal consumed by sector are taken from CSEDS and are adjusted for process fuel consumption in the industrial sector. (See the “Consumption Adjustments for Calculating Expenditures” section on page 417.)

Electric Utility Sector

Btu Prices: 1973 Forward

State Btu prices, including insurance, freight, and taxes, are taken from *Cost and Quality of Fuels for Electric Utility Plants (C&Q)* for 1973 forward and are converted from cents to dollars per million Btu. Where individual State prices are withheld or unavailable, quantity-weighted Census division prices are assigned as shown in Table A2. Price estimates for Alaska are explained below.

Btu Prices: 1970 Through 1972

Btu prices for States are taken from the Edison Electric Institute's (EEI) *Statistical Yearbook* and are converted from cents to dollars. Delaware, DC, and Maryland are each assigned the combined price for the three States. The steam coal electric utility sector Alaska price for 1971 is estimated as discussed below.

Table A2. Electric Utility Sector Price Assignments, 1973 Forward

| State | Years | State/Census Division Prices Assigned |
|-------|--------------------|--|
| CT | 1975–1979 | New England |
| DC | 1976 | MD, VA |
| OK | 1973, 1974 1975 | West South Central CO, KS, MO, NM, TX |
| OR | 1983, 1989 | Pacific Contiguous |
| RI | 1974 | MA |
| VT | 1980, 1983–1986 | New England |

Alaska Prices: All Years

The *C&Q* does not collect or publish prices for Alaska. The Alaska prices for 1994 forward are estimated from an informal survey of the single coal supplier in the State. Prior to that, Btu prices for Alaska are based on data from the EEI *Statistical Yearbook*. For the years 1970, 1972, 1974, 1976, 1977, and 1979 through 1993, prices were taken directly from the *Statistical Yearbook*. Prices for 1971, 1973, 1975, and 1978 are estimated from the *Statistical Yearbook* prices for the United States and the average ratio of AK-to-U.S. prices for the years when AK prices are available. The 1971 and 1973 estimated prices are based on the average ratio for 1970 and 1972; the 1975 price is based on the average ratio for 1974 and 1976; and the 1978 price is based on the average ratio for 1977 and 1979.

U.S. Prices: All Years

U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from CSEDS.

Data Sources**Prices**

1973 forward: Energy Information Administration, *Cost and Quality of Fuels for Electric Utility Plants*, Table 3 (1973-1979), Table 51 (1980-1982),

Table 50 (1983, 1984), Table 40 (1985-1989), Table 7 (1990, 1991), and Table 2 (1992 forward).

1994–1997: Alaska price estimated from informal discussions with Usibelli Coal Mine Co., the only coal supplier in Alaska.

1970–1993: Edison Electric Institute, *Statistical Yearbook of the Electric Utility Industry*, table titled “Analysis of Fuel for Electric Generation: Total Electric Utility Industry” (1970–1988), Table 29 (1989–1993).

Consumption

1970 forward: Energy Information Administration, Combined State Energy Data System, electric utility sector coal consumption.

Conversion Factors: All Years

Btu prices are taken directly from the data sources; no explicit conversion factors are used.

Residential Sector

Residential sector steam coal prices are the average delivered prices for coal purchased by residential customers and include taxes.

Prices: 1979 Forward

Residential steam coal Btu prices for 1979 forward are not available. Electric utility coal spot prices from *C&Q* for 1979 forward are converted from cents per million Btu to dollars per million Btu and are used in a regression equation to estimate residential steam coal prices for 1979 forward. The residential steam coal prices calculated for 1974 through 1978 from *Gas Househeating Survey (GHS)* and the average Btu spot prices from the *Cost and Quality of Fuels for Electric Utility Plants (C&Q)* for 1974 through 1978 are used to develop the regression equation. AK residential coal prices are estimated by using a different methodology, described on page 337.

Table A3. Residential Sector Coal Spot Price Assignments from C&Q, 1979 Forward

| State | Years | State Prices Assigned |
|-------|--|-----------------------|
| CO | 1979, 1981 | KS |
| CT | 1975 | NY |
| | 1976–1979 | NH |
| | 1980–1987, 1993–1995 | MA |
| DC | 1976–1997 | MD |
| ID | 1974, 1979–1982 | NV |
| | 1975–1977 | SD |
| | 1978 | ND |
| | 1983–1997 | CO |
| MA | 1975 | VT |
| | 1976–1979 | NH |
| ME | 1974, 1975, 1981, 1983 | VT |
| | 1976–1980, 1982 | NH |
| | 1984–1997 | MA |
| MT | 1974, 1975, 1978 | ND |
| | 1976, 1977 | SD |
| | 1979–1982 | NV |
| ND | 1976, 1977 | SD |
| | 1979–1995 | MN |
| NH | 1974, 1975, 1981, 1983 | VT |
| | 1984, 1985 | MA |
| NV | 1975–1978, 1983–1989, 1992, 1993, 1995 | CO |
| RI | 1974 | CT |
| | 1975 | VT |
| | 1976–1979 | NH |
| | 1980–1997 | MA |
| SD | 1978, 1984 | ND |
| | 1979–1983, 1986, 1987, 1989, 1991–1997 | MN |
| UT | 1975–1978, 1980, 1983 | CO |
| | 1979 | NV |
| VT | 1976, 1980 | NH |
| | 1984–1997 | MA |
| WA | 1970 | OR |
| | 1974–1978, 1983–1985 | CO |
| | 1979–1982 | NV |
| WY | 1974–1976, 1978, 1982, 1983, 1985 | CO |

Some States have *GHS* residential prices during the 1974 through 1978 period to use in the regression analysis, but are missing prices in the 1979 forward data used to calculate prices. For these missing data, *C&Q* prices are assigned from other States for use in the regression, as shown in Table A3. *C&Q* prices for ND and MT for some years result in a negative price when used in the regression; therefore MN spot prices are assigned to ND for use in the regression and the WY final price is assigned to MT as shown in Tables A3 and A4.

Price estimates for 1974 through 1978 for some States are not available because there was no consumption. To calculate prices for 1979 forward, these States are assigned the final prices from selected States as shown in Table A4.

In addition, several States are assigned the simple average of the final prices of adjacent States as shown in Table A4.

Table A4. Residential Sector Spot Coal Final Price Assignments, 1979 Forward

| State | Years | State and Averaged Final Prices Assigned |
|-------|--|--|
| AR | 1980, 1982, 1984, 1985, 1987–1995 | AL |
| | 1981 | MO, OK, TN, TX |
| | 1983 | MO, MS, OK, TN |
| AZ | 1982, 1984, 1985 | CA, NM, NV, UT |
| | 1987, 1988, 1990–1995 | UT |
| CA | 1979–1985 | NV |
| | 1987–1997 | WA |
| FL | 1980–1996 | GA |
| LA | 1980, 1982, 1984, 1986, 1988, 1991, 199–1995, 1997 | AL |
| MS | 1979, 1980, 1983, 1984, 1986–1995, 1997 | AL |
| | 1985 | AL, AR, TN |
| MT | 1986–1995, 1997 | WY |
| NM | 1979–1997 | CO |
| OK | 1979–1997 | CO |
| OR | 1979, 1980, 1982–1997 | WA |
| | 1981 | CA, ID, NV, WA |
| TX | 1980–1982, 1985–1997 | CO |

Prices: 1971 Through 1978

For 1971 through 1978, Btu steam coal prices are calculated by using data from *GHS*. The price for a State is equal to the simple average of the city/utility price observations for that State. For 1971 and 1972, *GHS* reports physical unit prices rather than Btu prices (as published for 1973 through 1978) and, therefore, the State-level conversion factors for this sector from CSEDS are used to convert to Btu prices for those years. AK residential coal prices are estimated by using a different methodology, described on page 337.

A simple average of price observations in CT, MA, ME, NH, RI, and VT is assigned to each of these States. To impute other missing prices in the 1971 through 1978 period, States are assigned simple averages of adjacent State prices or are directly assigned the single price of an adjacent or nearby State as listed in Table A5.

Prices: 1970

Since State-level coal price data for 1970 are not available from either *GHS* or *C&Q*, the 1970 residential sector coal prices are calculated by using the 1971 through 1978 data from the *Statistical Yearbook* for the 39 States, with some reported coal use from 1971 through 1983 and regression analysis.

For estimating the 1970 prices, States missing *Statistical Yearbook* data are assigned prices as follows: ID for 1970 through 1978 from MT; MA for 1976 through 1978 from CT; ME for 1970 through 1978 from NH; RI for 1973 and 1975 through 1978 from CT; and WA for 1970 through 1972 from OR. DC, DE, and MD are all assigned the combined *Statistical Yearbook* price for those States. Wherever individual State prices are unavailable, prices are assigned from an adjacent or nearby State as follows: CA from NV; NM from CO; OK from CO; OR from WA; and TX from CO. AK residential coal prices are estimated by using a different methodology, described as follows.

Table A5. Residential Sector Spot Coal Price Assignments, 1971-1978

| State | Years | State Assigned or Averaged Prices |
|-------|------------------------------|-----------------------------------|
| AL | 1971 | TN |
| AR | 1977, 1978 | AL |
| CA | 1971, 1972, 1974, 1978 | NV |
| DC | 1971-1978 | MD |
| DE | 1971, 1972, 1974, 1976, 1977 | MD |
| GA | 1971 | NC, TN |
| | 1972 | AL, NC, TN |
| ID | 1977 | MT, UT, WY |
| KS | 1971, 1972 | CO, MO |
| MN | 1971 | IA, ND, WI |
| | 1972 | IA, WI |
| MS | 1978 | AL |
| MT | 1971 | ID, ND, WY |
| | 1972, 1973 | ID, WY |
| ND | 1972 | IA, WI |
| | 1973 | MN, SD |
| | 1974 | MN, MT, SD |
| NE | 1971, 1972 | CO, IA, MO, WY |
| | 1975 | CO, IA, KS, MO, SD, WY |
| NJ | 1971, 1972, 1974, 1977, 1978 | DE, NY, PA |
| NM | 1971 | CO |
| NV | 1971, 1972, 1975 | ID, UT |
| | 1973 | ID, OR, UT |
| OK | 1971-1978 | CO |
| OR | 1971-1978 | WA |
| SC | 1971, 1972 | NC |
| SD | 1971 | IA, ND, WY |
| | 1972 | IA, WY |
| TX | 1971-1974, 1977 | CO |
| UT | 1974, 1978 | CO, ID, NV, WY |
| WA | 1971, 1972, 1974 | ID |
| | 1977 | MT, UT, WY |
| WV | 1971, 1972 | KY, MD, OH, PA, VA |

Alaska Prices: All Years

The AK residential coal prices for 1994 through 1997 are estimated from an informal survey of the single coal supplier in the State.

The AK residential Btu prices for 1978 through 1993 are estimated from the WA State prices during that period. To estimate the AK price for each year that AK has consumption, the average ratio of AK-to-WA prices during 1970 through 1977 is applied to the WA price.

AK physical unit prices for 1970 through 1977 are estimated by using the ratio of AK-to-U.S. electric utility sector prices.

U.S. Prices: All Years

U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from CSEDS.

Data Sources

Prices

1974 forward: Energy Information Administration, *Cost and Quality of Fuels for Electric Plants*, average spot coal prices, Table 2 (1974-1979), Table 44 (1980-1982), Table 49 (1983, 1984), Table 39 (1985-1989), Table 8 (1990, 1991), and Table 3 (1992 forward).

1994-1997: Alaska price estimated from informal discussions with Usibelli Coal Mine Co., the only coal supplier in Alaska.

1971-1978: American Gas Association, *Gas Househeating Survey*, table titled "Competitive Fuel Prices."

1970-1978: Edison Electric Institute, *Statistical Yearbook of the Electric Utility Industry*, Table 43S.

Consumption

1970 forward: Energy Information Administration, Combined State Energy Data System, residential sector coal consumption.

Conversion Factors: 1971, 1972

Energy Information Administration, *State Energy Data Report 1997, Consumption Estimates*, Table C8.

Table A6. Commercial Sector Final Price Assignments

| State | Years | State Prices Assigned |
|-------|-----------------------|-----------------------|
| CT | 1980 | NY |
| CT | 1995-1997 | MA |
| DC | 1980-1997 | MD |
| NH | 1994, 1996-1997 | MA |
| OK | 1970 | KS |
| RI | 1982, 1983, 1991-1997 | MA |
| VT | 1993-1997 | MA |

Commercial Sector

Commercial sector prices are assigned from industrial steam coal prices. States without Btu industrial steam coal prices were assigned the prices from adjacent States, as shown in Table A6. The AK prices for 1994 through 1997 are estimated from an informal survey of the single coal supplier in the State. U.S. Btu prices are calculated as the average of all States' Btu prices, weighted by consumption data from CSEDS.

Industrial Sector

Industrial coal prices from 1980 forward are taken from Form EIA-3, which collects quarterly data on manufacturers' coal stocks, receipts, prices, and consumption. Through the end of 1988, all manufacturers that consumed coal were required to respond to EIA-3, but thereafter, respondents were limited to those manufacturers that consumed 1,000 or more tons in the reporting year. Data prior to 1980 are based on the average cost of coal sold to manufacturing firms, which was reported on a monthly basis.

Physical Unit Prices: 1980 Forward

For 1984 forward, State prices are published in the EIA *Coal Industry Annual (CIA)*. Prices include insurance, freight, and taxes. Price data for 1980 through 1983 are taken directly from Form EIA-3.

Table A7. Industrial Sector Steam Coal Price Assignments, 1980 Forward

| State | Years | Prices Used in the Assignment | State | Years | Prices Used in the Assignment |
|-------|-----------------------|-------------------------------|-------|-----------------------|-------------------------------|
| AZ | 1980 | CA, UT | NM | 1980 | TX, UT |
| | 1981, 1984–1986 | CA, CO, UT | | 1981 | CO, OK, TX |
| CO | 1980 | KS, UT | | 1982, 1983 | AZ, CO, OK, TX |
| CT | 1981–1994 | New England | | 1984–1986 | CO, OK, TX, UT |
| DC | 1980, 1981 | MD | | 1987 | AZ, CO, OK, TX, UT |
| DE | 1980–1997 | MD | | 1988–1997 | AZ, CO, TX, UT |
| FL | 1980 | AL, GA | NV | 1980, 1981, 1984–1986 | CA, ID, UT |
| HI | 1982, 1983, 1987–1997 | CA | | 1983, 1987–1997 | AZ, CA, ID, UT |
| LA | 1980–1997 | AR, TX | OK | 1980 | AR, KS, MO, TX |
| MA | 1980–1983 | NY | | 1984–1997 | AR, CO, KS, MO, TX |
| | 1984–1997 | New England | OR | 1980, 1981, 1983–1997 | CA, ID, WA |
| ME | 1980–1983 | NY | | 1982 | CA, ID, NV, WA |
| | 1984–1997 | New England | RI | 1980, 1981 | NY |
| MS | 1980–1997 | AL, AR, TN | | 1984–1990 | New England |
| MT | 1983, 1987–1992 | ID, WY | SD | 1980 | IA, MN, MT |
| | 1984–1986 | ID | | 1981 | IA, MN, MT, NE |
| | 1993–1997 | ID, SD, WY | | 1982 | IA, MN, MT, WY |
| ND | 1980–1982 | MN, MT | | 1983, 1987–1997 | IA, MN, WY |
| | 1983–1992 | MN | | 1984–1986 | IA, MN, NE |
| | 1993–1997 | MN, SD | VT | 1980–1983 | NY |
| NE | 1980 | IA, KS, MO | | 1984–1992 | New England |
| | 1982, 1983, 1987–1992 | CO, IA, KS, MO, WY | WV | 1980 | KY, MD, OH, PA, VA |
| | 1993–1997 | CO, IA, KS, MO, SD, WY | WY | 1980 | ID, MT, UT |
| NH | 1980–1983 | NY | | 1981 | CO, ID, MT, NE, UT |
| | 1984–1993, 1995 | New England | | 1984–1986 | CO, ID, NE, UT |
| NJ | 1980–1997 | NY, PA | | | |

Prices for States in which data are withheld or unavailable are estimated by using simple averages of the published data for adjacent States. In a few cases, only a single adjacent State or Census division price is published and, therefore, available for the estimation. The adjacent State and Census division price assignments used for estimations are shown in Table A7. Price estimates for Alaska are explained on page 341.

Physical Unit Prices: 1971, 1974 Through 1979

For 1971 and 1974 through 1979, available cost and quantity of bituminous coal, lignite, and anthracite from the *Annual Survey of Manufactures*

(*ASM*) or *Census of Manufactures (CM)* are used to calculate prices as average cost per unit of sales for covered States. (States with undisclosed data are not considered covered.) Although it is not clear from the data sources, the prices probably include taxes.

For States with industrial steam coal use and for which *ASM* or *CM* data are not available in 1971 and 1974 through 1979, adjacent State simple averages of available *ASM/CM* data are used to impute prices. The assigned prices from adjacent States are shown in Table A8.

Table A8. Industrial Sector Steam Coal Price Assignments for 1971 and 1974-1979

| State | Years | State Prices Used in the Assignment | State | Years | State Prices Used in the Assignment |
|-------|-------------------------------------|-------------------------------------|-------|---------------------------------|-------------------------------------|
| AR | 1971, 1972, 1974, 1975 1979 | MO, TN MO, TN, TX | MT | 1974-1978 1979 | MN, NE, UT MN, UT |
| AZ | 1971 1974-1978 | CA, NV, UT CA, UT | ND | 1974-1979 | MN |
| CO | 1974-1978 1979 | KS, NE, UT UT | NE | 1979 | IA, MO |
| CT | 1974-1978 1979 | MA, NY NY | NH | 1971, 1974-1979 | MA |
| DC | 1971, 1974-1979 | MD, VA | NM | 1971 1974, 1976-1978 | CO, OK, TX, UT KS, UT |
| DE | 1971, 1974-1979 | MD, NJ, PA | | 1979 | UT |
| FL | 1979 | AL, GA | NV | 1974 1975-1979 | CA, OR, UT CA, UT |
| ID | 1974 1975-1978 1979 | OR, UT UT UT, WA | OK | 1974, 1975 1976-1978 1979 | KS, MO AR, KS, MO MO, TX |
| KS | 1979 | MO | OR | 1975-1978 1979 | CA CA, WA |
| LA | 1978 1979 | AR TX | RI | 1971, 1974-1978 1979 | MA NY |
| MA | 1979 | NY | SD | 1971, 1974 1975-1978 1979 | IA IA, MN, NE IA, MN |
| ME | 1975-1978 1979 | MA NY | TX | 1974, 1975 1976-1978 | KS AR, KS |
| MS | 1971, 1974, 1975, 1979 1976-1978 | AL, TN AL, AR, TN | VT | 1971, 1974-1978 1979 | MA NY |
| MT | 1974-1978 1979 | MN, NE, UT MN, UT | WA | 1974 1975-1978 | CA, OR CA |
| ND | 1974-1979 | MN | WY | 1974-1978 1979 | NE, UT UT |
| NE | 1979 | IA, MO | | | |
| NH | 1971, 1974-1979 | MA | | | |
| NM | 1971 1974, 1976-1978 1979 | CO, OK, TX, UT KS, UT UT | | | |

Physical Unit Prices: 1970, 1972, 1973

Steam coal industrial sector prices for 1970, 1972, and 1973 (years for which no *ASM/CM* prices are available) are estimated by using regression techniques. Values for the independent variable are steam coal electric utility sector physical unit prices, and values for the dependent variable are the steam coal industrial physical unit prices (from *ASM* or estimated, as described above) for 1971, and 1974 through 1977. A few

States are assigned electric utility prices for the dependent variable in the regression, as shown in Table A9.

Wherever individual State prices remain unavailable after the estimation that used the above regression techniques, prices are assigned from adjacent or nearby States, as shown in Table A10.

Physical Unit Prices: Alaska, All Years

There was no steam coal consumption reported Alaska's industrial sector in 1995. The Alaska steam coal industrial sector prices for 1994, 1996, and 1997 are estimated from an informal survey of the single coal supplier in the State. For all other years with industrial steam coal use in Alaska (1993 and 1970 through 1977), prices are estimated by assuming that the ratio of the Alaska price to the U.S. price in the industrial sector is the same as the ratio of the Alaska and U.S. prices in the electric utility sector.

Btu Prices: All Years

Btu prices for States are calculated from the physical unit prices and the conversion factors, which vary by State and by year. U.S. Btu prices are calculated as the average of all States' Btu prices, weighted by consumption data from CSEDS, adjusted for process fuel and coking coal consumption.

Data Sources**Prices**

1984 forward: Energy Information Administration, *Coal Industry Annual*, Table 94.

Table A9. Industrial Sector Price Assignments Used in the Regression Equation for 1971, and 1974-1979

| State | Years | State Prices Assigned |
|-------|------------|-----------------------|
| AR | 1973-1977 | MO |
| CA | 1970-1977 | NV |
| CT | 1975-1977 | NY |
| DC | 1976, 1977 | MD |
| ID | 1970-1977 | MT |
| MA | 1976, 1977 | NH |
| ME | 1970-1977 | NH |
| OK | 1973-1975 | KS |
| OR | 1973-1977 | WA |
| TX | 1970 | NM |
| WA | 1970-1972 | OR |

Table A10. Industrial Sector Final Price Assignments for 1970, 1972 and 1973

| State | Years | State Prices Assigned |
|-------|------------------|-----------------------|
| AR | 1972 | MO, TN |
| NH | 1970, 1972, 1973 | MA |
| RI | 1970, 1972, 1973 | MA |
| SD | 1970, 1972, 1973 | IA |
| VT | 1970, 1972, 1973 | MA |

1980-1983: Energy Information Administration, "Quarterly Coal Consumption Report: Manufacturing Plants" (Form EIA-3). Only published data are used from Table 25 (1980), Table 11 (1981, 1982), and Table 2 (1983).

1971, 1974-1979: Bureau of the Census, U.S. Department of Commerce, *Annual Survey of Manufactures* and *Census of Manufactures*, Table 4 (1971) and Table 3 (1974-1979).

1970, 1972, 1973: Steam coal electric utility physical unit prices.

Consumption

1970 forward: Energy Information Administration, Combined State Energy Data System, industrial (other than coke plants) coal consumption.

Conversion Factors: All Years

Energy Information Administration, *State Energy Data Report 1997, Consumption Estimates*, Tables C10, and C11. Conversion factors for 1971, 1972, 1973, and 1974 are available only from EIA's website, <http://www.eia.doe.gov/pub/state.data/data/>. The ASCII comma-delimited data file, convfac.csv, contains conversion factors for all States and years. The conversion factor used for industrial steam coal is labeled "BCOCK" followed by the two-letter State abbreviation. Consumption in Vermont in 1986, Rhode Island in 1990, Connecticut in 1990 and 1995, and New Jersey in 1996 and 1997 is assumed to be anthracite and is converted to Btu using the national annual anthracite factors shown in Table C1 of the *State Energy Data Report*.

Transportation Sector

Transportation use of coal accounted for 298 thousand short tons out of a total of 523,231 thousand short tons in 1970 and declined to none after 1977. Transportation sector steam coal prices are assigned from industrial sector steam coal prices. U.S. Btu prices are calculated as the average of the State Btu prices, weighted by CSEDS consumption data.

Coal Coke, Imports and Exports

Imports and exports of coal coke are components of total U.S. energy consumption and are accounted for in the industrial sector. Prices and values of imports and exports are developed only for the United States; no attempt is made to estimate State-level prices or expenditures. Prices are f.a.s. (free alongside ship) values and do not include taxes. The quantities of U.S. coal coke imports and exports are taken from CSEDS.

Physical Unit Prices: All Years

For 1980 forward, the *Coke Plant Report*, the *Quarterly Coal Report*, and Bureau of the Census computer tapes provide physical unit coal coke import and export prices in dollars per short ton. For 1970 through 1979, *Coke and Coal Chemicals*, *International Coal*, and the *Minerals Yearbook* provide coal coke import and export physical unit quantities and values in short tons and dollars, respectively. Values are equivalent to expenditures.

Btu Prices: All Years

For 1980 forward, Btu prices are computed by dividing the physical unit prices by the conversion factor. For 1970 through 1979, physical unit

prices are computed by dividing the import and export values by their respective quantities, and Btu prices are computed by dividing the physical unit prices by the conversion factor.

Data Sources

Prices

1989 forward: Bureau of the Census, U.S. Department of Commerce, electronic data from "Monthly Report IM 145" and "Monthly Report EM 545."

1981–1988: Energy Information Administration (EIA), *Quarterly Coal Report*, October-December issues, Tables A11 and A13 (1981-1985) and Tables A10 and A12 (1986-1988).

1980: EIA, *Coke Plant Report*, Tables 7 and 8.

1978–1979: EIA, *Coke and Coal Chemicals 1979*, Tables 5 and 6.

1977: National Coal Association, *International Coal 1980*, tables titled "U.S. Imports of Solid Fuels and Customs Value" and "U.S. Exports of Coke and Value."

1976: EIA, *Coke and Coal Chemicals*, Tables 19 and 20.

1970–1975: Bureau of Mines, U.S. Department of the Interior, *Minerals Yearbook*, "Coke and Coal Chemicals" chapter, Tables 19 and 20.

Consumption

1970 forward: EIA, Combined State Energy Data System, U.S. imports and exports of coal coke.

Conversion Factor: All Years

24.8 million Btu per short ton.

Section 3. Natural Gas

Natural gas prices are developed for the residential, commercial, industrial, transportation, and electric utility sectors. Reported natural gas prices are retail prices for sales of natural gas to ultimate users.

In general, taxes are included in the prices. However, taxes collected by a utility from an end user and turned over to a Government authority frequently are not included in the revenues reported in the source documents and, therefore, are not included in the prices. Taxes paid by the utility (rather than the end user) are considered operating costs and are passed on to the end user as part of the rate. Therefore, Federal, State, business, and property taxes are typically included in the prices, while sales and other point-of-purchase taxes typically are not.

Estimates of the amount of natural gas consumed by the residential, commercial, industrial, and electric utility sectors are taken from the Combined State Energy Data System (CSEDS). Estimates for the industrial sector are adjusted to remove estimated refinery consumption and lease and plant use of natural gas, and estimates of transportation sector use are adjusted to remove pipeline fuel in each State. (See the discussion in Section 7, "Consumption Adjustments for Calculating Expenditures," on page 417.)

Residential, Commercial, and Industrial Sectors

Prices: 1987 Forward

All natural gas physical unit prices by State for the residential, commercial, and industrial sectors are taken from the Energy Information Administration (EIA) *Natural Gas Annual* (NGA).

Prices: 1970 Through 1986

All natural gas physical unit prices for the residential, commercial, and industrial sectors are calculated from value and quantity of sales data from the NGA or its predecessor report, *Natural Gas Production and Consumption*. State prices are calculated directly from the data sources as average revenue per unit of sales by natural gas utilities. Prices for each of the three sectors are calculated by dividing the value of natural gas, reported in thousands of dollars, by the quantity of natural gas sold, as reported in million cubic feet.

For 1970 through 1979, both the value and quantity of sales data from the NGA are reported as composites for MD and DC and for ME, NH, and VT. In each case, the combined prices are assigned to each of the States in the composite.

Btu Prices: All Years

State Btu prices for all years are calculated by using the physical unit price series and the State-level non-electric utility conversion factors. U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from CSEDS, adjusted for process fuel consumption in the industrial and transportation sectors.

Data Sources

Prices

1987 forward: Energy Information Administration, *Historical Natural Gas Annual, 1930 Through 1997*, Table 23 (residential); Table 24

(commercial 1987–1992) and Table 25 (commercial, 1993 forward); and Table 27 (industrial 1987–1992) and Table 28 (industrial, 1993 forward).

1980–1986: Calculated from quantity and value data published in the Energy Information Administration, *Natural Gas Annual, Volume 1*, Table 11 (1980), Table 14 (1981–1985), and Table 15 (1986). Comparable price data are available in the *Historical Natural Gas Annual, 1930 Through 1997*, Table 23 (residential), Table 24 (commercial), and Table 27 (industrial).

1970–1979: Calculated from quantity and value data published in the Bureau of Mines, U.S. Department of the Interior, *Natural Gas Production and Consumption*, Table 6 (1970 and 1979) and Table 7 (1971–1978). Comparable price data are available in the *Historical Natural Gas Annual, 1930 Through 1997*, Table 23 (residential), Table 24 (commercial), and Table 27 (industrial).

Consumption

1970 forward: Energy Information Administration, Combined State Energy Data System, residential, commercial, and industrial natural gas consumption.

Conversion Factors: All Years

Energy Information Administration, factors published rounded in *State Energy Data Report 1997 Consumption Estimates*, Tables C4 and C5.

Transportation Sector

Most of the natural gas used for transportation is consumed in pipeline operations and is discussed in Section 7, “Consumption Adjustments for Calculating Expenditures,” on page 417. A small but increasing portion is consumed by natural gas vehicles. Prices for natural gas consumed by vehicles are reported in the EIA *Natural Gas Annual* beginning in 1990. Much of the natural gas delivered for vehicle fuel represents deliveries to fueling stations that are used primarily by fleet vehicles.

In the first years of the vehicle fuel price series, the coverage of the reporting universe is not complete. Prices are assigned, when missing,

from an adjacent State with the highest percentage of reported data. Natural gas vehicle fuel consumption for NE is assigned the SD price in 1992, 1993, and 1995; NV is assigned the AZ price in 1992 and 1993; and DE is assigned the MD price in 1994.

Data Sources

Prices

1990 forward: Energy Information Administration, *Historical Natural Gas Annual, 1930 Through 1997*, Table 30.

Consumption

1990 forward: Energy Information Administration, Combined State Energy Data System, natural gas vehicle consumption.

Conversion Factors: All Years

Energy Information Administration, unrounded conversion factors as published rounded in the *State Energy Data Report 1997, Consumption Estimates*, Tables C4 and C5.

Electric Utility Sector

Prices: 1973, 1974, 1983 Forward

Prices for States are reported by *Cost and Quality of Fuels for Electric Utility Plants (C&Q)* for gas consumed at steam-electric plants only. Btu prices are taken from C&Q, converted from cents to dollars per million Btu.

Where individual State prices are unavailable from C&Q, they are developed from the *NGA*. Physical unit prices prior to 1987 are calculated by dividing the value of natural gas, reported in thousands of dollars, by the quantity of natural gas sold, reported in million cubic feet. For 1987 forward, physical unit prices are taken directly from the *NGA*. Table A11 lists the States and years for which *NGA* data are used. Btu prices

Table A11. Natural Gas Electric Utility Sector Prices from NGA, 1973 Forward

| State | Years |
|-------|-----------------------------------|
| AK | 1973–1990 |
| CT | 1974–1976 |
| ID | 1983–1986 |
| MD | 1973, 1974, 1983–1985 |
| NC | 1983–1990 |
| ND | 1973, 1974, 1976–1986 |
| NH | 1973, 1974, 1977, 1987–1989 |
| PA | 1973 |
| RI | 1976, 1980 |
| SC | 1977 |
| SD | 1983–1990 |
| TN | 1976, 1980, 1981, 1983, 1988–1996 |
| UT | 1988, 1989 |
| VT | 1983–1985, 1989, 1990 |
| WA | 1978, 1983–1985, 1988, 1989 |
| WY | 1973, 1975 |

Note: NGA includes predecessor publications.

are calculated from the physical unit prices by using State-level electric utility conversion factors.

Prices are not available from either *C&Q* or *NGA* for CT in 1973; ID in 1974, 1987; NH in 1983, 1996; OR in 1983, 1984, 1986, 1989, 1990; SD in 1997; and TN in 1997. In these cases, quantity-weighted Census division prices from *C&Q* are assigned. In addition, prices for VT in 1986 and WA in 1986, 1987, 1990 use quantity-weighted Census division prices from *C&Q* for more consistent prices than those available from the *NGA*.

Prices: 1980 Through 1982

State Btu and physical unit prices for 1980 through 1982 are taken from *C&Q* for all reporting plants. Physical unit prices are taken directly from the data source, while Btu prices are converted from cents to dollars per million Btu.

Prices: 1975 Through 1979

State prices are reported separately by *C&Q* for gas consumed at steam-electric plants and gas consumed at combustion turbine and internal combustion units. Weighted-average Btu prices are calculated by using the two *C&Q* prices and the respective gas deliveries for steam-electric and combustion use. The NH price in 1977 is not available from *C&Q*. A combined price is computed from value and quantity of sales data from the *NGA* for ME, NH, and VT and assigned to NH for 1977.

Prices: 1970 Through 1972

State prices for 1970 through 1972 are taken from *Natural Gas Production and Consumption* and are calculated similarly to the way prices for the residential, commercial, and industrial sectors are calculated. Prices, as average revenue per unit of sales, are computed from value and quantity of sales data from the source reports. A combined price is reported for NH and VT for 1971 and 1972, and each of these States is assigned the combined price. State Btu prices are calculated from the physical unit prices by using the State-level electric utility conversion factors.

U.S. Prices: All Years

U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from CSEDS.

Data Sources

Prices

1973 forward: Energy Information Administration, *Cost and Quality of Fuels for Electric Utility Plants*, tables shown in Table A12.

1990 forward: Energy Information Administration, *Historical Natural Gas Annual 1930 Through 1997*, Table 31.

1980–1989: Energy Information Administration, *Natural Gas Annual 1992, Volume 2*, Table 23.

Table A12. Tables from EIA *Cost and Quality of Fuels for Electric Utility Plants* Used as Data Sources

| Years | Price Data | Volume Data |
|--------------|-------------------------|-------------|
| 1973, 1974 | Table 10 | Table 9 |
| 1975–1979 | Table 10, 16 | Table 9, 15 |
| 1980–1982 | Table 48 | - |
| 1983, 1984 | Table 53 | - |
| 1985–1987 | Table 43 | - |
| 1988, 1989 | Table 44 | - |
| 1990, 1991 | Table 12 (1994 edition) | - |
| 1992 forward | Table 12 (1996 edition) | - |

1976–1979: Energy Information Administration, Energy Data Reports, *Natural Gas Production and Consumption*, Table 7 (1976–1978) and Table 6 (1979).

1970–1975: Bureau of Mines, U.S. Department of the Interior, *Natural Gas Production and Consumption*, Table 6 (1970) and Table 7 (1971–1975).

Consumption

1970 forward: Energy Information Administration, Combined State Energy Data System, electric utility natural gas consumption.

Conversion Factors

Btu prices that are calculated directly from *Cost and Quality of Fuels for Electric Utility Plants (C&Q)* require no conversion factors. When *Natural Gas Annual (NGA)* data are used to develop prices that are missing from *C&Q*, conversion factors are used from the following source:

1970 forward: Energy Information Administration, *State Energy Data Report 1997, Consumption Estimates*, Tables C2 and C3.

Section 4. Petroleum

Asphalt and Road Oil

The Combined State Energy Data System (CSEDS) assumes that all asphalt and road oil consumption occurs in the industrial sector. Asphalt and road oil are used primarily for paving (79 percent of consumption in 1970 and 89 percent in 1997), with the remaining products used for roofing and sealing. Taxes are not included in the prices because most street and highway paving is done under contract to State, county, and other public authorities who are typically exempted from paying taxes.

Physical Unit Prices: All Years

Asphalt prices in physical units are developed from monthly reports in the *Engineering News-Record*, a construction industry weekly magazine published by McGraw-Hill, Inc. The source data consist of monthly reports from correspondents in 20 U.S. cities with price quotes for tank cars, drums, or both, for the three major types of asphalt products: asphalt cement (AC-20), asphalt emulsion (rapid set and slow set), and asphalt cutback.

For 1986 forward, the tank car price is used. However, for 1986 and 1987, the drum price is used if a tank car price is not available. For 1970 through 1985, when both tank car and drum prices are available, a simple average of the two prices is used. When only one price is available, that price is used.

Asphalt prices are developed by calculating a simple average annual price from the monthly prices for each city for the three products. City prices are assigned to States. CA, OH (1970 through 1985, 1992 forward), and PA have prices from two cities; in these cases, simple

averages of the two city prices are used. No States have prices from more than two cities. An outlier data value for Minneapolis in June 1995 was omitted and the MN price for 1995 is an 11-month average. States with no prices are assigned a Census division simple average price. If there is no Census division price, the simple average of the prices for the other Census divisions within that Census region is used.

State average asphalt prices are calculated as the quantity-weighted average prices of the three products for each State. Quantity data for 1970 through 1980 are taken from the Bureau of Mines and EIA reports on sales of asphalt. Quantity data for 1981 forward are taken from the *Report on Sales of Asphalt in the U.S.*, published by the Asphalt Institute. Non-paving asphalts are assumed to have the prices of paving asphalt cement.

For 1970 through 1982, asphalt and road oil are estimated as separate data series. Asphalt prices are estimated as discussed above. Road oil prices are assumed to equal asphalt emulsion prices because specific prices are not available from any source.

Btu Prices: All Years

Asphalt prices in dollars per ton are converted to dollars per gallon by dividing by 235 gallons per ton for asphalt cement, 241 gallons per ton for emulsion, and 248.6 gallons per ton for cutback. These prices are then multiplied by 42 gallons per barrel and divided by 6.636 million Btu per barrel to get dollars per million Btu. Road oil unit prices of dollars per ton are converted to dollars per million Btu by using the constant conversion factors of 5.5 barrels per ton and 6.636 million Btu per barrel. The average price of all asphalt and road oil is the consumption-weighted average of the individual product prices.

U.S. Btu prices are calculated as the average of the State Btu prices, weighted by consumption data from CSEDS.

Data Sources

Prices

1970 forward: McGraw-Hill, Inc., *Engineering News-Record*.

Quantities for Calculating Weighted Average Prices

1981 forward: Asphalt Institute, *Asphalt Usage, United States and Canada*.

1977–1980: Energy Information Administration, Energy Data Reports, *Sales of Asphalt* (1978–1980) and *Asphalt Sales, Annual* (1977), Table 2.

1970–1976: Bureau of Mines, U.S. Department of the Interior, Mineral Industry Survey, *Asphalt Sales, Annual* (1971–1976) and *Asphalt Shipments, Annual* (1970), Table 2.

Consumption

1970 forward: Energy Information Administration, Combined State Energy Data System, industrial sector, asphalt and road oil consumption.

Conversion Factors: All Years

Conversion factors used are: 235 gallons per ton of asphalt cement; 241 gallons per ton of emulsion; 248.6 gallons per ton of cutback; 42 gallons per barrel; 5.5 barrels per ton of road oil; 6.636 million Btu per barrel.

Aviation Gasoline

Aviation gasoline prices are developed for the transportation sector. Estimates of the amount of aviation gasoline consumed by the transportation sector are taken from the Combined State Energy Data

System (CSEDS). Aviation gasoline prices are national averages, excluding taxes, developed from several sources, depending on the years. In all cases, physical unit prices are developed and then converted to Btu prices. Federal and State excise taxes, as well as State and local sales taxes, are not included.

Physical Unit Prices: 1976 Forward

Aviation gasoline prices for 1978 forward are assumed to be the national average refiners sales prices to end users published in the EIA's *Annual Energy Review*. The 1976 and 1977 prices are assumed to be the national average retail prices published in the EIA's *Monthly Energy Review*.

Physical Unit Prices: 1970 Through 1975

For 1970 through 1975, aviation gasoline prices are not available. Prices are derived by dividing the national motor gasoline prices for those years by the 1976 national motor gasoline price and applying those percent changes to the 1976 national aviation gasoline price.

Btu Prices: All Years

Aviation gasoline Btu prices are calculated by converting the physical unit prices from cents per gallon to dollars per barrel (42 gallons per barrel) and then to dollars per million Btu (5.048 million Btu per barrel).

Data Sources

Prices

1991 forward: Energy Information Administration, *Annual Energy Review 1998*, Table 5.20, row titled "Sales Prices to End Users: Aviation Gasoline."

1979–1990: Energy Information Administration, *Annual Energy Review 1994*, Table 5.20, row titled "Sales Prices to End Users: Aviation Gasoline."